| a) General | | | |
|---|---|---|---|
| *School* | ENGINEERING | | |
| *Academic unit* | MECHANICAL ENGINEERING | | |
| *Level of studies* | Undergraduate | | |
| *Course code* | MM908E02 | *Semester* | 8 |
| *Course title* | **Scientific research methodology** | | |

| *Independent teaching activities* | *Weekly teaching hours* | *ECTS* |
|---|---|---|
| Lectures | 4 | 4.0 |
| Laboratory exercises | | |

| | |
|---|---|
| *Course type* | Knowledge deepening/consolidation |
| *Course category* | Compulsory Elective for Directions 1 & 2 |
| *Prerequisite courses* | - |
| *Language of instruction and examinations* | Greek |
| *Is the course offered to Erasmus students* | No |
| *Course website (url)* | https://eclass.uniwa.gr/courses/MECH112/ |

b) Learning outcomes and general competences

b1. Learning outcomes

Upon successful completion of this course, the student will be able to:

- Describe the characteristics and stages of scientific research
- Describe various types of research, by drawing on examples from the science of mechanical engineering
- Search, point out and evaluate literature material relevant to a subject of research
- Apply basic criteria in order to select and establish a research problem and its sub-questions
- Suggest a specific strategy-methodology concerning a research problem of his/her interest
- Comprehend -in general- and review a published scientific study
- Use software for the management of bibliographic sources
- Develop a technical report or study in accordance with formalistic guidelines
- Apply good presentation practices on a scientific study

b2. General competences

- Search for, analysis and synthesis of data and information with the use of the necessary technology
- Working independently
- Team work
- Criticism and self-criticism
- Production of free, creative and inductive thinking

c) Syllabus

Types of scientific research, Framework and problems in scientific research, Examples of research in engineering sciences, Selecting a subject and forming a title, Establishing research questions or hypotheses, Literature review, Search of sources and literature, Compilation of literature and references, Software for the management of references, Recording and tracking bibliographical sources, Method selection for data collection: Quantitative and qualitative research, Data collection and analysis, Designing and addressing questionnaires, Calendars, Plagiarism, Writing and presentation of a research study, Examples.

d) Teaching and learning methods - Evaluation

| | |
|---|---|
| Delivery | Face - to - face (classroom, working groups) |

| | | |
|---|---|---|
| Use of information and communications technology | - Multimedia applications<br>- MS Teams/Moodle/eclass | |
| Teaching methods | *Activity* | *Semester workload* |
| | Lectures | 26 |
| | Tutorials | 12 |
| | Laboratory exercises | 26 |
| | Computational exercises | |
| | Individual work | 66 |
| | Course total | 130 |
| Student performance evaluation | Individual assignments and final written exam | |

e) Suggested bibliography


1. Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). SAGE Publications, Inc.
2. Keith, H., Sharp, J. A. (1998). *Η επιστημονική μελέτη - Οδηγός σχεδιασμού και διαχείρισης πανεπιστημιακών ερευνητικών εργασιών.* Gutenberg - Γιώργος & Κώστας Δαρδανός.
3. Locharoenrat, K. (2017). *Research Methodologies for Beginners.* CRC Press.
4. Thiel, D. V. (2017). *Research Methods for Engineers.* Cambridge University Press.